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ABSTRACT

In response to the assessed need for improving the basic academic skills of United States Navy personnel, a project was undertaken to develop a relevant remedial reading workbook for Navy recruit training commands (RTCs). The workbook was designed to augment existing commercial nonmilitary oriented remedial reading materials that were being used in Navy Academic Remedial Training (ART). The results of a two-month field test of the workbook at the Orlando, Florida, RTC/ART division were positive, indicating that it was a useful tool and that students were interested in and motivated by the Navy-related materials. (Author/RL)

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TAEG Report No. 79

DEVELOPMENT AND EVALUATION OF A REMEDIAL READING WORKBOOK FOR NAVY TRAINING

J. Peter Kincaid
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Training Analysis and Evaluation Group

December 1979

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FOREWORD

This study is one of a series of studies addressing the general area of readability in Navy recruit training in response to tasking by the Chief of Naval Education and Training (CNET). The primary result has been the development and evaluation of the Navy-relevant remedial reading workbook incorporated into this report.

Appreciation is expressed to the following personnel for their assistance in the development and testing of the workbook:

. The staff of the Academic Remedial Training (ART) Division, Navy Recruit Training Command, Orlando, who reviewed each exercise through a series of drafts and field tested the workbook. The ART staff was headed by AVCM V. Jones; military instructors were YN2 Keskeys, YN2 Gonzales, MS3 Clausen, SK3 Fogarty, and RM1 McCall; civilian instructors from the Orange County Webster Adult Education Center were Mrs. Nancy Ashcroft, Mrs. Linda Bradshaw, Mrs. Kathy McLaughlin, and Mrs. Joan Hendrickson. LT G. Molatch and LCDR J. Keefer arranged for the testing of the workbook. Military instructor B. Millard also participated in the field test.

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This report is concerned with the development of a Navy-relevant remedial reading workbook for use in Navy recruit training commands (RTCs). The project was undertaken by the Training Analysis and Evaluation Group (TAEG) as one of several initiatives in response to tasking by the Chief of Naval Education and Training (CNET) in the area of improvement of basic academic skills.

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The workbook is designed to augment existing commercial nonmilitary oriented remedial reading materials now being used in Navy Academic Remedial Training (ART).

The results of a 2-month field test of the workbook by personnel of the Orlando RTC ART division were positive, indicating that it is a useful tool and that students are interested in, and motivated by, the Navy-related materials.

The workbook, intended as a prototype for future development, has been distributed to all Navy RTC ART divisions and is being distributed to Navy Junior ROTC students in high schools throughout the United States. Application of this technique in regular recruit training is being considered.

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SECTION I

INTRODUCTION

Many of the candidates for Navy enlistment have deficient reading skills. In the current recruiting climate, the pool of potential recruits is becoming smaller and the reading ability of recruits appears to be declining.

The Navy is concerned with the functional reading ability of its personnel. Of particular importance is the need to teach the recruit with deficient literacy skills to read and use Navy training and job reading materials.

In view of this problem, the Navy has established Academic Remedial Training (ART) programs for the purpose of assisting recruits in overcoming deficiencies in reading abilities. These deficiencies interfere substantially with the successful completion of recruit training. The ART divisions are located at each of the three recruit training centers. The goal of the program is to raise the reading ability of the recruits experiencing such handicaps to the sixth grade level. This level is judged to be the minimum required for adequate understanding of recruit training materials.

In support of the remedial training program, the Training Analysis and Evaluation Group (TAEG) was tasked by the Chief of Naval Education and Training (CNET) to produce a Navy-relevant remedial reading workbook to augment existing commercial nonmilitary-oriented materials.[1] This tasking is in response to SECNAV Instruction 1510.3 (2 June 1978), Remedial Training in Basic Skills, which states:

> It is the policy of the Department of the Navy to provide, when indicated, on-duty remedial job-relevant basic skills training in order to fill personnel requirements.

Job-relevant basic skills training is defined in this same instruction as:

> Any instruction in basic skills which utilizes the contents of training courses, job tasks or career advancement requirements as the basis of the curriculum.

The intent of this instruction is to provide remedial training required for successful completion of Navy training programs, adequate job performance, and career advancement.

NEED FOR REMEDIAL TRAINING IN THE MILITARY SERVICES

A recent study conducted by the Department of Defense (Sellman, 1979) concluded that each of the military services has a substantial number of new

[1] CNET ltr Code N-53 of 20 Dec 78

enlistees with reading deficiencies. The percentages of newly enlisted personnel in the military services that have reading abilities below the sixth grade level range from a low of 4.6 percent in the Air Force to a high of 16.3 percent in the Army. The figure for the Navy is 8.3 percent. Sixth grade reading ability is considered the minimum level the trainee should possess to graduate from recruit or basic training and function reasonably well during the first enlistment.

A Government Accounting Office (GAO) study (1977) addressing illiteracy problems stressed the need for literacy training in the armed services and pointed out the critical role of reading ability in job-performance and in the advancement of military personnel throughout their enlisted careers.

> Available information demonstrates that poor readers, when compared to the average military population, (1) have higher discharge and attrition rates, (2) experience more difficulty in technical training, (3) perform less satisfactorily on the job, (4) and have less potential for career advancement. Such conditions are not only costly but inhibit effective use of manpower.

The importance of reading ability for the successful completion of recruit training was articulated in detail by the Navy Personnel Research and Development Center (NPRDC) (Duffy, 1976). A sample of over 22,000 recruits undergoing training in San Diego from June 1974 to February 1975 was tested using the Gates-MacGinitie Reading Test, Survey D (Gates and MacGinitie, 1965). Armed Forces Qualification Test (AFQT) scores and Odds of Effectiveness ratings were also used in the battery. The Odds of Effectiveness rating is derived from an actuarial table used by recruiters to predict completion of the first enlisted tour. A composite score is derived from years of schooling, the number of expulsions and suspensions from school, and the AFQT score (Plag, 1968). The Gates-MacGinitie reading test score, however, was by far the best predictor of attrition from recruit training.

CURRENT MILITARY INITIATIVES IN REMEDIAL TRAINING

The military services (except the Marine Corps) provide some form of literacy training and each has policies to integrate the remedial training into recruit (or basic) training. The Army requires that the remedial reading program for basic trainees be Army skill-related.

> Reading and vocabulary reinforcement will use, as applicable, Soldiers' Manuals, DA pamphlets, Army regulations, and field manuals, supplemented by instructor guides, dictionaries, other learning aids, and available reading improvement materials and equipment. Emphasis will be given to vocabulary improvement in the job tasks the trainee will encounter in MOS training.[2]

[2]Army Regulation 621-45, Change 2, 15 December 1978

The Army's literacy training is part of their Basic Skills in Education Program (BSEP) which covers not only remedial reading but also remedial mathematics and English as a Second Language (ESL).

The Air Force literacy training program described by Stitch, Fox, Hauke, and Zaph (1977) requires all newly inducted Mental Category IV personnel reading below the sixth grade level to be given remedial reading instruction. This program is administered prior to basic training.

The Navy's remedial reading program is currently the major part of the ART. Academic Remedial Training activities are located at each of the Navy's Recruit Training Centers (RTC) (Orlando, Florida; San Diego, California; and Great Lakes, Illinois).

PURPOSE OF REPORT

The purpose of this report is to describe the development of the format and content of a Navy-relevant remedial reading workbook and the evaluation of the workbook in the Navy's remedial reading program. The workbook was seen as a necessary supplement to the ART curriculum which did not contain enough Navy-relevant material. Since the workbook was designed as an addition to, rather than a replacement for, the ART curriculum, this report contains a description of how the workbook matches the curriculum.

APPROACH

The development of the workbook involved a two-pronged approach including:

- examination of existing Navy-relevant materials that might be appropriate for inclusion into the ART curriculum, and
- interviews with subject matter experts (both RTC personnel and remedial reading specialists) to determine appropriate content and format of the workbook.

The initial effort in developing the workbook began with a review of existing Navy-relevant remedial reading materials to ascertain what was immediately useful. Three such sources were located. Two were developed for foreign Navy personnel learning English as a second language; the third was last used during the mid-1960s in Project 100,000 for Navy personnel who were functionally illiterate.

The Navy-relevant English as a Second Language texts were:

- a three volume series, Navy Terminology-Seamanship, published by the Defense Language Institute in 1975, and
- The Language of the Navy in English (Sansom, 1978) produced by a commercial publisher.

They are not part of the current ART curriculum. Both should be useful if the Navy establishes an English as a Second Language program. The other Navy-relevant reading source is the two volume series, Navy Life, which was published by the Bureau of Naval Personnel and last widely used during the mid-1960s for Project 100,000 (Fletcher, 1976). These two volumes were developed for recruits with reading skills below the fourth grade level. The current ART program is geared to students with reading skills between the fourth and sixth grade levels. Therefore, the Navy Life series is not part of the current ART curriculum.

The second effort in developing the workbook was to interview ART instructors and RTC personnel in order to obtain insights into the design of formats for the workbook. These individuals provided considerable information on the Navy subject matter that should be contained in the workbook. The topics suggested were considered most difficult for recruits in regular recruit training and could be incorporated into formats suggested by the remedial reading instructors.

ORGANIZATION OF THE REPORT

In addition to this introduction, the report contains three sections and two appendices. Section II describes the current ART program. Section III describes how the sections of the workbook match the ART curriculum, selection of content, and vocabulary and readability controls employed. Section IV presents the evaluation of the workbook, the manner in which this was accomplished, and conclusions and recommendations. The workbook Improving Your Navy Reading Skills is presented as appendix A. Appendix B contains questionnaire items and instructor responses.

SECTION II

THE NAVY'S ACADEMIC REMEDIAL TRAINING PROGRAM

As a prelude to the description of the development of the workbook, it is worthwhile to describe the rationale and organization of ART. According to the current Academic Remedial Training curriculum guide published by the Chief of Naval Technical Training (CNTECHTRA) in 1979, the ART program is designed to remediate the deficiencies of the recruit as measured and identified by diagnostic instruments. The remediation activities, when mastered, enable the recruit to complete recruit training with at least a minimum proficiency level.

The diagnostic instrument currently in use is the Stanford Diagnostic Reading Test (1976, Brown Level). It measures the major components of the reading process to diagnose strengths and weaknesses in reading. There are five subtests: vocabulary, reading comprehension, phonetic analysis, structural analysis, and reading rate.

The auditory vocabulary subtest requires the recruit to select the word or words (that are dictated) that best fit the meaning of a sentence.

The reading comprehension subtest assesses both literal and inferential comprehension by the use of short reading passages, followed by multiple-choice questions. Passages cover a variety of subjects and are written for students in grades 5 through 8.

The phonetic analysis subtest assesses the recruit's ability to recognize particular sounds in words and to select a word that has the sound in it.

The structural analysis subtest measures the ability of the recruit to identify the first syllable of two-syllable words (syllabication) and to identify meaningful word parts and blend them into real words (blending).

The reading rate subtest assesses the recruit's ability to read easy material quickly with comprehension. Since the subtest is designed to measure speed of reading, very few recruits are expected to finish it within the time limit. The number of correct responses indicates the level of reading with comprehension, while the number of items attempted (right or wrong) can be used to measure speed of reading.

Figure 1 shows how the subtests of the Stanford Diagnostic Reading Test are related to the separate modules of instruction in the ART program. There are two differences between the modules of the ART program and the subtests of the Stanford Diagnostic Reading Test. Phonetics analysis and structural analysis are separate in the standard test but are combined into a single ART module (decoding). Also the ART curriculum contains a study skills module, which is not a part of the Stanford test. All recruits in the ART program go through the study skills module; study skill is not measured by the diagnostic test. Recruits in ART go through only the modules in ART (except for study skills) on which they are shown to be deficient according to the Stanford test.

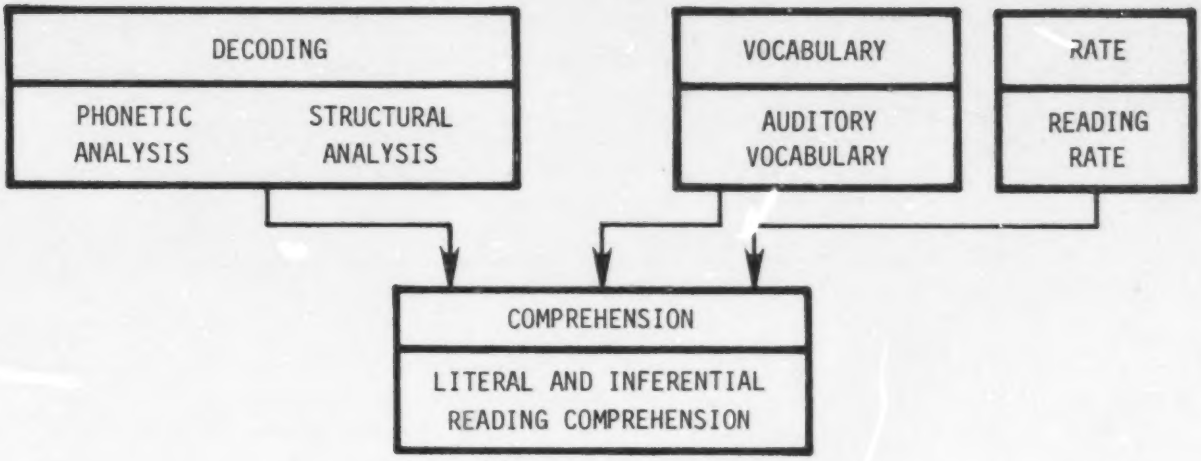

Figure 1. Relationship Between Stanford Diagnostic Reading Test (Brown) Subtests and ART Components (from ART Curriculum Guide)

Placing ART students only in those modules in which they have demonstrated deficiencies is working well. Recruits are gaining the reading skills they need to successfully complete recruit training in the shortest possible time. The average time to complete ART is currently less than 4 weeks, and more than 90 percent of ART graduates are completing recruit training.

SECTION III

DEVELOPMENT OF THE WORKBOOK

The remedial reading workbook contained in appendix A of this report was developed for use by recruits with deficient reading skills. The format and contents of the workbook are based on the following points of guidance:

- The structure is consistent with that of the Navy's existing ART program, which consists of five modules (see section II).
- The format is comparable to that used by publishers of commercial remedial reading materials, with emphasis on such factors as readability and vocabulary.
- Important topics from the regular recruit training program are incorporated into the text. Given that the most important job for the recruit is to complete recruit training, the workbook is job-related reading material.

COMPATIBILITY OF WORKBOOK WITH ART CURRICULUM

To insure compatibility with the reading skill components in the ART program, the workbook was written to directly incorporate several of the same sections--reading comprehension, word analysis skills (including decoding), and vocabulary. The other two ART modules are also represented in the workbook. Reading rate can be measured by timing recruits working through the comprehension exercises; there is a table in the appendix of the workbook for this purpose. The workbook stresses study skills to the extent that topics included are those that recruits need to master to complete recruit training.

The workbook was originally designed as a supplement to, rather than a replacement for, the existing ART curriculum materials. However, it has now become a regular part of the curriculum. For example, the entire word analysis skills section of the workbook is designed for students who have already mastered basic concepts in phonetic and structural analysis. ART students will have worked through a considerable number of commercially available exercises before being assigned exercises in this workbook section. Also, the entire vocabulary section is based specifically on "Navy" words (e.g., "coxswain," "aft"). While these are important for the ART student to learn, they still represent only part of the vocabulary that should be mastered. Most vocabulary words contained in Navy training material are also common in such widely used reading material as popular magazines and newspapers. Therefore, vocabulary sections of commercially available remedial reading kits are useful for the ART student. The vocabulary section of the workbook is a supplement to these.

READABILITY AND VOCABULARY CONTROLS

Educational publishers ordinarily use readability measures such as the Flesch Reading Ease formula (Flesch, 1948) and vocabulary measures such as the Dale-Chall list of common words (Dale and Chall, 1948) in their production

of remedial reading materials. Similar processes were used in the production of the workbook.

Readability of each comprehension passage was measured by the Flesch-Kincaid readability formula currently in wide use by the military services (Kincaid, Fishburne, Rogers, and Chissom, 1975; Army Regulation 310-3, Change No. 12, 15 September 1979; MIL-M-38784A, Amendment 5, 24 July 1978). The reading grade level of each passage as well as the number of words in each passage are listed on p. 122 of the workbook. Seven out of nine passages range from grade levels of 4.0 to 6.5. Two of the exercises dealing with military subject matter have higher grade levels. "Recognizing Chief Petty Officers and Other Enlisted Personnel" is written at a grade level of 8.5. "Military Justice" is written at a grade level of 10.5. These two more difficult passages were included to help the ART student transition from remedial reading to the reading of regular recruit training material which is typically written at the ninth grade level or higher.

Exercises in the comprehension section were arranged to be read in sequence. The ordering was completed considering both number of words in each exercise and its readability level. Shorter and more readable exercises are at the beginning of the section and longer more difficult exercises are at the end. Many publishers use the Dale-Chall list of common words to control the vocabulary words appearing in the text. The Dale-Chall list is not appropriate for Navy training material as it is based on recognition of words by elementary school students. What is a common word to a Navy recruit is not necessarily a common word to a fourth grade student. Thus, a decision was made to construct a list of common Navy terms.

This list is based on a computerized word frequency analysis of the two recruit training books, Basic Military Requirements (1973) and The Bluejackets' Manual, 20th Ed. (Naval Institute, 1978). A total of nearly 240,000 words from these two sources were counted and about 1,900 words were identified as appearing 10 or more times. From this list of 1,900 words, about 250 words were identified as having a particular Navy or military connotation. These were given simplified definitions as shown in the Glossary of Frequently Used Naval Terms of the workbook.

SELECTION OF CONTENT

Both the Navy personnel and remedial reading specialists agreed that more Navy material should be added to the ART curriculum. More specifically, several military topics were identified as causing recruits difficulty during recruit training (e.g., the Uniform Code of Military Justice, recognition of Navy officers and enlisted personnel, and Navy words, such as the parts of ships). These topics were given particular emphasis in the development of the workbook.

SECTION IV

EVALUATION OF THE WORKBOOK

The workbook was evaluated in two phases. The first phase was conducted concurrently with the original writing. This phase included evaluation of each exercise as well as the overall organization of the workbook through consultation with two kinds of instructional specialists: Navy recruit training personnel and remedial reading specialists.

EXERCISE DEVELOPMENT

As exercises were drafted, they were presented to seven remedial reading instructors and 10 Navy personnel for separate reviews. In addition, ART instructors solicited informal comments from selected students who were asked to work through the exercises. The overall organization of the workbook, and its compatibility with the existing ART curriculum, was coordinated with personnel from the staff of CNTECHTRA having responsibility in this area. Also, professors from Memphis State University, who authored the new ART curriculum under CNTECHTRA contract, were consulted.

All exercises were revised as comments were received. Some exercises in the workbook emerged in final form only after five or six revisions. The many people who participated in this review process are listed in the acknowledgments of the workbook.

DRAFT WORKBOOK REVIEW

Once a draft of the entire workbook was complete, it was reviewed as a package for technical and military accuracy. The same specialists who reviewed separate exercises reviewed the draft workbook. Then it was subjected to standard editorial considerations. In summary, a significant amount of the total effort of producing the workbook was spent in the review process.

FIELD TEST PROCEDURE

A limited number of the workbook was printed for a 2-month field test conducted by the ART staff at RTC Orlando, Florida. Instructors were furnished 150 copies of the workbook and requested to have students use them as a supplement to the regular curriculum. Instructors were also given a questionnaire to complete. The individual instructor responses to the questions are contained in appendix B. In addition to the questionnaire, TAEG received information on workbook use by frequent on-site visits to the ART program and informal interviews with both ART instructors and students.

The results of these actions indicated that the workbook served to motivate recruits, simplified difficult materials, improved reading comprehension, and prepared students for recruit training.

Instructors reported that the workbook was used in a variety of ways. Most students used it for self-study, and many went completely through it from beginning to end with only minimal guidance from the instructor. One instructor reported assigning specific exercises for students with particular

weaknesses. Several military instructors placed special emphasis on exercises dealing with uniforms and Orders to the Sentries to prepare the student for regular recruit training.

Instructors also reported that recruits seemed to enjoy working through the book. The ART students were allowed to keep the workbook upon graduation from ART, and a substantial number of workbooks were used by recruits who were not referred to the ART program. The recruits reported that simplified treatments in the workbook of such subjects as Military Justice allowed easy mastering of the material for the tests given in recruit training.

Comments by both instructors and students indicated that students were interested in the workbook because they realized that working through it would help them to do better when they returned to regular recruit training. While these comments were informal and not documented, they were of equal importance to the questionnaire in the evaluation process.

OUTCOMES TO DATE

Progress in workbook development to date indicates the following:

- The workbook has proved a valuable addition to the existing ART program. It has filled a need to provide more Navy-relevant material in the curriculum to better prepare ART graduates for regular recruit training.

- The ART curriculum guide issued in August 1979 has incorporated virtually every exercise of the TAEG workbook into the prescriptions used in all five ART modules. The Training Analysis and Evaluation Group has had 1,000 copies of the workbook printed and distributed to the three ART units at the request of CNET (Code N-5) and CNTECHTRA.

- Acceptance of the workbook by ART students and military and civilian ART instructors has been excellent. Students have shown more interest in using the workbook than any other books in the ART curriculum.

- Most ART students can use the workbook with a minimum of guidance from their instructors.

The content and format of the workbook have been shown to be effective. Currently the Navy is considering establishing remedial programs for class "A" schools and apprentice training schools and also expanding the current ART program. The Army's remedial program, Basic Skills in Education (BSEP), is receiving considerable resources for ongoing development. The TAEG workbook, Improving Your Navy Reading Skills, is a highly relevant prototype for the development of curriculum materials for these programs. In addition, the comprehension section of the workbook may prove useful as a model in developing recruit training curriculum materials. A workbook to be used by recruits would serve as a valuable addition to The Bluejackets' Manual and Basic Military Requirements. It should contain only subject matter that is pertinent

to the successful completion of recruit training, and it should present the material in a simple and readable way. Much of the material could be drawn from The Bluejackets' Manual and Basic Military Requirements and then simplified, as was the case in developing the workbook.

In workbook development, a major caution is indicated. Material must be checked carefully to verify accuracy. Even a small number of errors could cause instructors, students, and administrators to question the validity of the entire product.

POST NOTE

At the time the workbook was being tested in Orlando, it was being evaluated for possible use by the Navy's Junior ROTC Program. A decision was made to make the workbook a regular part of the NJROTC curriculum and 10,000 copies are being printed under the auspices of CNET N-162 for distribution during FY 80.

The workbook has been assigned NAVTRA number 37081 and, therefore, is available for future distribution to ART units, Navy Junior ROTC programs, and other potential users as a regular part of the Navy's training materials inventory. In addition, the workbook is being considered as a model for the development of similar materials for the Army and for Navy "A" schools.

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